MSC Guidelines for Review of Motor Circuits

Procedure Number: E2-15 Revision Date: 04/24/00

References

a. 46 CFR 111.70

b. National Electric Code, current edition

c. American Bureau of Shipping; *Rules for Building and Classing Steel Vessels*, current edition

d. American Bureau of Shipping; *Rules for Building and Classing Mobile Offshore Drilling Units*, current edition

e. SOLAS, Consolidated Edition, 1997 or most recent edition

f. NVIC 2-89, *Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units*

g. MSC Procedure E2-1, Vital System Automation

h. MSC Procedure E2-20, Steering Gear Controls and Alarms

Disclaimer

These guidelines were developed by the Marine Safety Center staff as an aid in the preparation and review of vessel plans and submissions. They were developed to supplement existing guidance. They are not intended to substitute or replace laws, regulations, or other official Coast Guard policy documents. The responsibility to demonstrate compliance with all applicable laws and regulations still rests with the plan submitter. The Coast Guard and the U. S. Department of Transportation expressly disclaim liability resulting from the use of this document.

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General Review Guidance

Note: This guidance is only applicable for vessels regulated under 46 CFR, Subchapter J. Other vessel classification (e.g. subchapter T) requirements may differ from those listed below.

- Check motor use: (111.25-1)

- Steering Gear: (58.25; see procedure E2-20)

  - Power actuating motor must restart automatically when power is restored after it has failed (58.25-30; 111.70-3(b)). This is accomplished with the Low Voltage Release (LVR) controller (for description see NVIC 2-89, 3.12)

  - The feeder circuit to the steering motor must have an instantaneous trip protection set between 300-375% of the full load current for a DC motor (NEC 430-147) or 175-200% of the locked rotor current for an AC motor (NEC 430-151 (B)) (58.25-55(a)).

- Propulsion Motor: (111.35; ABS4/5D2 (*Steel Vessels* 1997); see procedure E2-1)

- Elevator, Fire Pump, or vital propulsion auxiliary: (111.70-3(b))

  - Low voltage release (LVR) required (for description see NVIC 2-89, 3.12).

- All Others: (111.70-1; ABS 4/5)

  - Feeder fuse or breaker thermal trip to be set to no greater than 250% of full load amps for squirrel cage induction motor or synchronous motor, 200% of FLA for autotransformer start motor, and 150% of FLA for wound rotor (ABS 4/5A5.13.3 (*Steel Vessels* 1997)).

  - Feeder breaker magnetic trip to be set to not less than 10x FLA of motor (ABS 4/5A5.13.3 (*Steel Vessels* 1997)).

  - For .5 KW motors and up: (ABS 4/5A5.13.4,5 (*Steel Vessels* 1997))

    - Thermal overload (running protection) to be set to 100-125%
    - Low voltage protection required (see NVIC 2-89, 3.12)

  - Feeder cable to motor must have a capacity greater than 100% of the nameplate rating of all the motors it supplies. (ABS 4/3.94.1 (*Offshore Drilling* 1997))

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- A motor control circuit conductor must have overcurrent protection unless it is inside the controller enclosure, the branch circuit overcurrent is no greater than 300% of the control circuit conductor capacity, or the opening of the control circuit creates a hazard. (111.70-7(a))

- Controller has to be designed so a ground doesn t remove the ability to stop a running motor or cause an inert motor to start. (111.70-7(b))

- Controller must draw from the load side of the motor (111.70-7(c)) unless the control functions require circuits that must be common to more than one controller. In this case, either a clearly marked disconnect independent of the motor and controller (111.70-7(d)(1)) or a device that de-energizes the controller upon opening of the door (111.70-7(d) (2)) must be provided.

- Motor controllers and motor control centers must be marked with nameplate data (111.70-3(d)).

- A motor controller with a separate heater circuit must have a separate disconnect adjacent to the motor controller (111.70-5(a)). Check for deck machinery exception (111.70-5(b)).

- Insulation Tests (ABS 4/5C4.5,7 (*Steel Vessels* 1997))

- Motor starters (ABS 4/3.87.4,5 (*Offshore Drilling* 1997))

- Starting switch may serve as disconnect in small motors (below 2 HP, 250 Volts), otherwise it needs a separate disconnect (ABS 4/3.87.4,5 (*Offshore Drilling* 1997)).

- Thermal overload (running protection) to be set to 100-125% for all motors except steering motors (ABS 4/3.115.6 (*Offshore Drilling* 1997))

Attachments: None